



Missouri Department of Natural Resources Comments

**on the
U.S. Department of Energy
Long-Term Stewardship Plan**

**for the
Weldon Spring, Missouri, Site**

September 10, 2002

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General Comments

1. While we appreciate the use of the internet to provide copies of this key document, it should not be the only means of distribution. Because of the quality of print and lack of color, key aspects of the plan (e.g. maps and tables) are hard to identify and use as intended. Hard copies should be provided to many stakeholders initially and summarily to anyone that requests one.
2. The inclusion of detailed maps and drawings including color in appropriate figures represents a significant improvement and has been a great help in understanding the information presented. Please continue and enhance this practice where possible.
3. An executive summary of the LTS plan, including a definition of “Stewardship” would be helpful.
4. Throughout the document DOE indicates what actions they took to remediate various portions of the site, however, they fail to specifically show where residual contamination is located. The fact that contamination remains in the waste disposal cell, as well as many other areas, at levels that would restrict future uses, are the reason that Stewardship actions are warranted. DOE should clearly define the nature and extent of contamination remaining and provide an explanation of why leaving it is acceptable.
5. The level of detail is deficient. Specific information on baseline conditions, design criteria, allowable tolerances, and how conformance to these specifics will be maintained, must be included. The level of detail should be sufficient to allow regulators and other competent environmental professionals to evaluate and manage the site. This will include specific instructions for who, what, when, and how the multiple tasks involved will be accomplished. Instructions should also be provided on the method and level of detail to be included in of records documenting site activities.
6. A detailed cost estimate for all components of stewardship operation, including overall project management; monitoring; maintenance, inspections, regulatory oversight, and public information/participation should be provided in this document.
7. There is reference to EPA and the Federal Facility Agreement as the enforceable instrument for completion and documentation of stewardship work at the WSSRAP. An enforceable agreement that includes all parties must be secured and DOE should follow through on its previous commitment to revise the current Federal Facilities Agreement to include the state of Missouri as a legal party to the agreement.

8. There is no provision or commitment to continued evaluation of evolving Science and Technology that may be applicable to enhancing protectiveness of the site.
9. The document has several references indicating that the TCE remediation will be completed in 2002. However, current schedules and communication with WSSRAP on-site personnel indicate that the TCE remediation may not be implemented at this time. Which is the actual condition. We reiterate our position that this treatment process should proceed without further delay.
10. The document references on-site presence in several locations, which the department considers appropriate. However, discussions with WSSRAP staff and newspaper articles indicate that after 2004, DOE will no longer be present at the site. Which is correct?
11. Discussion of future “5-year” reviews references the current EPA guidance, which is appropriate. However, the document states that the last Five-year review was performed in 2001. This review was evaluated by department staff, using the then current EPA guidance, and found it to be seriously deficient. A comment letter was drafted and sent to DOE, noting our observations. DOE has not yet responded to that letter. A “periodic review” should be completed as soon as possible, which is consistent with the current EPA guidance. This approach would also be consistent with the CERCLA guidance that calls for “periodic reviews” at a frequency of no more than once every five years.
12. The plan states that DOE will perform scheduled annual inspections and non-scheduled site inspections. The department should be given the opportunity, and provided with sufficient funding, to participate in and provide comments on these inspections.
13. Several stewardship provisions are listed as “DOE may do...” This wording should be changed to “DOE will do”.
14. Several references are made to activities at the “mill”. It is obvious that this document was modeled after a Uranium Mill Tailings site rather than the different and, in some ways, more complex WSSRAP site. References to “mill” are not applicable and should be corrected. Also, uranium Mill Tailings sites are traditionally located in remote arid environments which contrast significantly with the humid, urban settings where the WSSRAP site is located.
15. The Chemical Plant property has confirmation units released to sub-surface criteria that contain levels of residual contamination higher than those allowable for surface release. DOE needs to ensure that erosion and mixing effects do not uncover subsurface contamination at levels that would be inappropriate for surface exposure. Any future land use contemplated should contain appropriate institutional controls to restrict any excavation in the area. To confirm continued safety at the site the department recommends that DOE conduct a MARSSIM Class 3 evaluation of areas containing residual contamination as part of the CERCLA “periodic review.” A

Class 3 area is defined by MARSSIM (Page 2-5 in Chapter 2) as: “Any impacted areas that are not expected to contain any residual radioactivity, or are expected to contain levels of residual radioactivity at a small fraction of the DCGL, based on site operating history and previous radiation surveys”. This is applicable as the Chemical Plant area was remediated and contains residual radioactivity at a small fraction of the site criteria.

16. The Southeast Drainage is a dynamic losing stream that contains un-remediated soils. The DOE needs to ensure that erosion and redeposition do not leave residual contamination in inappropriate places. To accomplish this, the department recommends that DOE consider annual sampling of sediment from beneath the Katy Trail Bridge and sediment from the North end of the Highway 94 culvert.
17. Burgermeister Spring, as a significant discharge point for the Chemical Plant area, should be evaluated for redeposition of radioactive materials. The department recommends that the DOE consider annual sampling of the sediments accumulated between the point of emergence and the downstream weir.
18. As the plan is refined, but before it is finalized, it seems appropriate to conduct a dry run of those aspects that can be accomplished such as inspections, equipment checks, typical Institutional Controls verification, etc. We request that DOE factor this into development of the plan.
19. Add a Definitions page for words used throughout the document that may have a specific meaning to DOE. For example: Stewardship, Operable Unit, Stakeholders, etc.
20. In the appropriate section, add information on who will staff the Interpretive Center. If not staffed, how will vandalism at the site be prevented? If staffed, by whom and what hours?
21. The department is in the process of evaluating information provided in DOE’s August 21, 2002, letter to Director Stephen Mahfood. Additional comments may be indicated, subject to this review.

Specific Comments

Section 1.1

1. Paragraph 2. Why only “consultation” for the state of Missouri and “concurrence” from U.S. EPA? RCRA sites require concurrence from EPA and the department. Without concurrence, the substantive requirements of RCRA as an ARAR will not be met. The department requests that the document be in effect upon concurrence of EPA and the state.

2. Paragraph 2. What does the statement “DOE...will provide stewardship services” mean? It is our understanding that other entities (Saint Charles County, for instance) have been identified to provide at least some of the activities the department considers to be “stewardship services”

Section 1.2

1. General. RCRA post-closure disposal cell monitoring and maintenance requirements are ARARs.” RCRA has been identified as an ARAR for the disposal cell and department post-closure oversight is a RCRA requirement.
2. Paragraph 1. Our understanding from reading this paragraph is that DOE is the legal owner of all waste generated at the site, including residual soil and groundwater contaminants, materials in the disposal cell, and those materials disposed of off-site. Is this a correct interpretation?
3. Paragraph 2. Is there some distinction between the terms “contaminated” or “stored” as used in this paragraph?
4. Paragraph 3. DOE should clarify that there are four operable units, three of which have a Record of Decision and one that has an Interim Record of Decision. Also, Remedial Actions have been conducted on the three RODs and are nearly complete. Final Remedial Action reports exist for the Quarry and Quarry Residual and remain to be finalized for the Chemical Plant cell construction under the ROD.
5. Paragraph 5. (Top of Page 1-3). DOE references guidance for UMTRCA site-specific LTS plans for long term custody and care for a typical remediated uranium processing site and disposal facility. We believe the Weldon Spring setting is significantly different from a typical uranium mill tailings facility. There are numerous other documents addressing long term stewardship, some from a broader perspective than the referenced document. The department urges DOE to give further consideration to other guidance documents, which may be more applicable to the WSSRAP.

Section 2.1.1

1. Paragraph 2. The various vicinity properties and groundwater contaminated by historic operation are a part of the site, as defined by the FFA, and should be included in this and subsequent descriptions.
2. Paragraph 3, last sentence should include the St. Charles well field and treatment plant(s) as two of the smaller portions of land that the Army transferred ownership to.
3. Paragraph 4. The quarry also borders Missouri Route 94, the St. Charles County shooting range, and the Missouri Department of Natural Resources Katy Trail State Park.

4. Paragraph 6. Private residences are located just west of the Quarry and north of the Chemical Plant. This paragraph should include this fact.
5. The highway adjacent to the Chemical Plant and quarry is incorrectly identified. The correct name is Missouri State Route 94. The text should be revised.
6. In addition to the Francis Howell School District, the Missouri Department of Transportation, the Community of Weldon Spring Heights, and the University of Missouri, the well field and water plant was transferred to St. Charles County. St. Charles County should be added to the list of property owners.

Section 2.1.2

1. Paragraph 3. DOE states that the Chemical Plant area watersheds are not sources of irrigation or public drinking water supply. What is the basis for determining that the water from these watersheds is not used for irrigation? What about water supplies taken from the Missouri and Mississippi Rivers? It seems remiss for DOE to absolve the Chemical Plant from any relationship to possible water use yet fail to mention that the Quarry watershed has the potential to impact the St. Charles County well field.
2. Paragraph 4. Good elevation data for the quarry, an average elevation for the Missouri River or an approximate vertical elevation change between the site and the river would be helpful. Also, it should state in this section that contaminated groundwater from the quarry has the potential to impact the St. Charles County well field and Femme Osage Slough.

Section 2.2.1

1. Paragraph 2. States that the facility was decontaminated prior to transfer to the AEC in 1955. This implies a level of effort that we are sure was not envisioned at that time. Please be more specific regarding what is meant by the term “decontamination” in this context. Also, this paragraph should include a reference to recycled uranium materials, which were also processed at the Chemical Plant.
2. Paragraph 4. Should include a referenced to recycled uranium materials.
3. Paragraph 5. What care does “caretaker status” imply? Were any environmental studies completed in this period?
4. Text needs to be added to the discussion of the Weldon Spring Ordnance Works concerning waste stream disposal practices similar to that included for the Weldon Spring Chemical Plant.

Section 2.2.2.2

1. First Paragraph. “the remedy included remediation...and temporarily stored material in an on-site engineered disposal facility”. What is being referred to as “temporarily stored”? The waste in the cell?
2. Paragraph 2. “Approximately 1.48 million cubic yards...of source materials” is stated in context with building debris, asbestos, etc. Does the cell contain source material or waste?

Section 2.2.2.3

1. Paragraph 1. Should explain how the raffinate pits were allowed to overflow into the southeast drainage during the “caretaker status” and prior operation.
2. Paragraph 2. States “This removal is expected to control the source of spring water contamination.” The department considers this a misleading statement as the SED contains source areas that were not remediated and the springs remain contaminated. It is our understanding that the removal actions taken in the Southeast Drainage were designed to reduce the potential exposure to recreational visitors or hypothetical children. What technical information has DOE relied on to determine that there are no other possible sources of the noted spring contamination?
3. How could the hunter and resident child scenarios gauge whether the decision is protective of the environment? The assertion in the first sentence, that ecological risk was gauged, is certainly not supported in this section. Also, what are the criteria for the “hunter” or “hypothetical resident child” scenarios? The specific scenarios should be stated in the plan.

Section 2.2.2.4

1. Paragraph 1. This is a misstatement of the facts. Regulator and public response to the GWOU Proposed Plan was for further study of the feasibility of a pump-and-treat remedy for all contaminants other than TCE. The Interim Record of Decision was designed to implement, not simply study, in situ treatment of TCE contamination. Please correct.
2. Paragraph 2. Is in conflict implying that TCE remediation was completed in 2002, and later that “DOE will address results and identify the final remedy for cleanup of TCE and other contaminants in the final Ground Water OU Record of Decision (pending).” We adamantly disagree with this approach. No sufficient justification has been provided to delay implementation of the Interim Record of Decision. The results of the pilot studies were a success. DOE should implement the remedy selected for TCE contamination now.

Section 2.2.2.5

1. The document references remedial actions taken at the Quarry, however, it fails to identify the nature and extent of the residual contamination; the reason Stewardship is needed for this area.

Section 2.2.2.6

1. DOE indicates they verified their models, etc. In order to understand anything about what this means, you would have to review the data & their reports. They should admit they studied the area in response to a request from the state to consider various options to cleanup the groundwater including construction of a collection trench across the area of greatest contamination. After operating the trench for two years, they demonstrated that - while the trench was effective in removing some contamination; it was not considered sufficient to warrant full scale or permanent cleanup of the groundwater contamination. As a result, no cleanup is planned and the uranium groundwater plume will be monitored to confirm it remains a low threat to further groundwater contamination.
2. The description does not address contamination remaining under highway 94 or on the northeast slope. This area should be considered for Institutional Controls in a similar manner to the culvert under highway D. If MoDOT ever does anything to update Hwy 94 in this area, there are potentially contaminated soils that workers need to be made aware of.

Section 2.3.1

1. General: In several instances in this chapter DOE indicates that the potential residual radioactivity is insignificant; it may be appropriate to say very low. Both terms are somewhat vague.
2. Does a waste water plant still remain on site?
3. Paragraph 1. What are the referenced cleanup criteria?
4. Paragraph 2. The department does not agree that federal government ownership is a sufficient level of institutional control. The deed to the property should contain appropriate restrictions, as should all properties impacted by residual contamination
5. Paragraph 3. States “DOE will pursue an agreement...”. “Pursue” should be replaced with “take action to implement.” Also, while Burgermeister Spring is addressed, there is no mention of contaminated springs in the 5300 drainage. Please correct this oversight.
6. Paragraph 4. What is the “approved hypothetical child scenario” and who approved it?

7. Paragraph 6. States "...DOE will attempt to remove ..." should read "DOE will remove." Also, the paragraph discusses DOE's guideline of 100 millirem per year. EPA guidance specifies dose exceeding 15 millirem as not appropriate for "free release". Please correct this oversight.

Section 2.3.2

1. General. Design criteria, tolerances, and anticipated changes should be specified for all disposal cell features. For instance, what is the expected settlement and where? What is the purpose of the various components of the LCRS (including sump components)? What is the projected leachate generation rate over time (our understanding is that it will decline)? What degree of rock degradation is allowable for various areas of the cell (differing slopes for instance)? How will the various leachate monitoring and alarm systems be calibrated or checked and how will discrete samples be obtained from each component? Also, a more complete description of the function of each cell component should be included. For all components, a specific description of indications of potential problems should be provided.
2. Paragraph 1. The amount of radioactivity listed as stored in the cell is in error. Please correct. The disposal cell is referenced as covering 45 acres and being 91 feet in height. Is this accurate? It would be helpful if the plan identifies the actual area of the base of the disposal cell, the horizontal plane covered by waste materials, and the total area covered by the waste area plus sideslopes. (Also should include subgrade description of pad and clay barriers.)
3. Paragraph 2. Is it possible to monitor the quantity and quality of leachate for each pipe in the primary and secondary collection system? Is this being done? If not, why not?
4. Paragraph 3. What potential problems could arise from the degradation of radon in the disposal cell? We are aware of possible issues at the Fernald, Ohio, site that may have a bearing on the performance/impact of the WSSRAP radon barrier. Has the Fernald issue been given appropriate consideration?
5. Paragraph 4. Why are V shaped swales used versus the more common U shaped to minimize erosion?
6. Paragraph 5. The sequence of the liner components is not clear from this description and it does not seem to match figure 2-7. Also, there should be some note of the siting requirement for the equivalent of 30 feet of 10^{-7} clay under the engineered cell.
7. Paragraph 6. A recent disposal cell inspection noted several feet of water in the secondary sump around the leachate sump. Site personnel reported that the flow in the drain gravel in this annulus was so slow that this component could not be dewatered because the "pea gravel" in the annulus was not permeable enough to allow water to flow to the pipe in any practical time. That is, the monitor well in the secondary sump becomes dewatered after a relatively short period of low-volume

pumping, but recovers to the original level in the next day or so. Considering this, how will this secondary sump meet its intended function?

8. Paragraph 8. Will someone be present near the leachate sump to hear the audible alarms? Can they be responded to from a location that will be monitored in some other way?

Section 2.3.3

1. Identify what levels of contamination remain or are estimated to remain in the soils and groundwater for the Quarry area.
2. See comments on Section 2.2.2.6 regarding contamination under Highway 94 and the northeast slope.

Section 2.4.1.1

1. General: DOE indicates nitrate persists in groundwater and is likely to enter the conduit system and subsequently discharge to springs. The department has requested that DOE, at a minimum, consider passive treatment of nitrates at the seeps and springs. What efforts have been taken by DOE to address this contamination. Failure to fully address contamination is unacceptable and will be recommended for referral of assessment of Natural Resource Damages.
2. Paragraph 1. States “Contamination in ground water is generally confined to the shallow, weathered portion of the Burlington-Keokuk Limestone, which discharges to springs in the former Ordnance Works area.” If it is “generally confined” where is the rest of the contamination? Vertical extent of contamination must be addressed. What exactly does the DOE consider the former Ordnance Works area in this context?
3. Paragraph 2. What efforts have been taken to evaluate and research natural denitrification or enhanced denitrification. Recent guidance developed by the ITRC indicates the likelihood of in situ biodegradation for many sites.
4. Paragraph 3. What is the basis for the assertion in this paragraph? If the only remaining contamination is in the shallow aquifer system as described here then the Institutional Controls in the Southeast Drainage don’t seem to address this fact. We suspect that spring contamination is a combination of the sources described and runoff from areas of residual contamination during precipitation.
5. Uranium contaminated groundwater above the drinking water standard is identified beneath the former raffinate pits. However, uranium contamination in groundwater is known to extend over a greater portion of the site. The drawings should indicate all areas of contamination above background levels. This comment applies to other contaminants of concern as well.
6. Paragraph 6. Volatiles, including TCE have been detected in nearby springs.

Section 2.4.1.2

1. General: DOE should describe the nature and extent of groundwater contamination remaining at Quarry; for easy future reference this should include the highest levels

of contamination and the estimated number of curies. All areas contaminated above background levels should be identified on a drawing.

2. A discussion of reduction of nitroaromatics by biotransformation in the reduction zone could not be located in either of the two revisions of the referenced document. The specific location (Section and page number) for this information should be provided.
3. Paragraph 1. Although quarry groundwater north of the slough is not a public drinking water source, it is hydraulically connected and contamination does impact the aquifer that is being used as the public water supply.

Section 2.4.3.1

1. Paragraph 5. It is our understanding that the groundwater divide has shifted to the south. It would be helpful to have a potentiometric map of the site and quarry groundwater, which is updated annually. A set of monitoring wells should be installed to measure static water annually, which may be different than water quality detection wells. Also, the issue of previously contaminated groundwater in vicinity of the disposal cell complicates the evaluation of whether or not the disposal cell is impacting groundwater quality. That being the case, it seems to be inappropriate to base a reduction in disposal cell monitoring activities on a decline in contaminant concentrations compared to baseline. The baseline represents a contaminated condition that is expected to improve over time through natural attenuation; possibly long before the disposal cell liner develops problems.
2. Paragraph 12. As previously commented we do not necessarily agree that “uranium presence is predominantly the result of historical surface water runoff.” It is possible that current runoff is also a source. Is there a factual basis for this assertion?

Section 2.4.3.2

1. On principal, the department disagrees with the assertion that low yield means this isn't drinking water or subject to the drinking water standards. It flows into a drinking water source and there is no guarantee that it will not affect that drinking water source sometime in the future. We acknowledge EPA's determination that this is not an aquifer, however, we believe that great care must be taken to make sure existing conditions remain stable.
2. The term *facies* is used to describe different depositional characteristics (conditions of origin) within a single rock unit. Bedrock and alluvium are separate units. For clarification, we recommend that the term *facies* be deleted.
3. Paragraph 2. It is our understanding that the monitoring wells adjacent to the Femme Osage Slough did have uranium levels, which corresponded to historic concentrations in the slough, that exceeded the drinking water standard. Subsequent to source

removal actions, the concentrations declined to current conditions. Please verify and correct.

4. A statement is needed that contaminated groundwater discharging to the slough (where fishing is conducted) does not represent a risk to users and that the slough water quality will be routinely monitored.

Section 2.4.4

1. General. The data presented in table 2-9 is not a representative baseline. 40CFR264.97(g) requires: The sample size shall be as large as necessary, to ensure with reasonable confidence, that a contaminant release to ground water from a facility will be detected.
2. The data in table 2-9 is a summary from 1998 to mid-2000. 40CFR264 (commonly referred to as RCRA) is intended for hazardous waste disposal facilities and has been identified as an ARAR for the disposal cell. The number of samples is not in question in this case, but active soil remediation ended in mid-2000. The department suggests that applying this data in a post-closure monitoring situation is inappropriate, as the data is biased high because of site operations and would make detection of releases from the cell difficult. A more appropriate baseline for disposal cell monitoring should consist of post-remediation samples preferably significantly separated from construction activities and after analyte levels have stabilized for a year or more.
3. Paragraph 1. It has not been demonstrated that Burgermeister Spring is the emergence point for all groundwater from the Chemical Plant site, as implied.
4. Paragraph 2. Groundwater monitoring prior to cell placement “although considered a baseline” can be misleading. Since the groundwater was and is contaminated, it has not been clearly demonstrated how releases from the cell (other than in the Leak detection system) would be identified in the groundwater monitoring. The fact that levels go down below what’s identified and remain, could indicate a continuing source of uncontrolled contamination beneath the waste disposal cell or released directly from the waste cell itself.
5. Paragraph 3. States “No baseline values are presented for volatile organic compounds... because these constituents were not detected during baseline sampling. The department believes that all contaminants of concern should be included in the baseline evaluation, therefore, the table should include these omitted analytes as not detected.

Section 2.5.2.1

1. The streams are characterized throughout this document as if they only convey storm water runoff. However, these streams also gain baseflow from the bedrock and soil subsurface. They most surely gain some contaminants in that fashion. The fact that sampled surface water near the site is above background confirms the need for continued periodic sampling. This comment also applies to surface water locations associated with the quarry.
2. Paragraph 1. In at least two places in this paragraph DOE indicates areas were remediated and confirmed CLEAN. This is most likely an inaccurate statement. Areas have likely been remediated to the approved cleanup or remediation goals. To indicate the areas are CLEAN, unless they have been remediated to background or non-detect, is inappropriate.

Section 2.6

1. In accordance with 10 CSR 25-7.264.264(2)(G) incorporated by reference in 40 CFR 264.116, facilities with waste remaining in place shall "submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Regional Administrator, a survey plat indicating the location and dimensions of landfills cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. This plat must be prepared and certified by a professional land surveyor. The plat filed with the local zoning authority, or the authority with jurisdiction over local land use, must contain a note, prominently displayed, which states the owner's or operator's obligation to restrict disturbance of the hazardous waste disposal unit in accordance with the applicable subpart G regulations." DOE shall comply with this regulation.
2. Paragraph 2. Since Table 2-12 is discussed in this paragraph, the paragraph should include a statement that the proposed institutional control mechanisms have been negotiated with and agreed upon with the "Parties to Agreement" shown in Table 2-12. Since institutional controls are critical to long term stewardship of the site, the institutional control mechanisms must be established now and implemented before or soon after final remedy selection.
3. Paragraph 3. "DOE will seek to maintain...." is somewhat ambiguous. Should be changed to something like "DOE will implement Institutional Controls in order to maintain....".
4. Paragraph 4. Last sentence, when will DOE establish the IC's?

Section 2.7

1. This section references aerial photos, maps, as-built drawings etc....what are these, where will they be located and how are they accessed? One set should be at the site and another at the local repository.
2. Annual inspections will likely not be sufficient to identify and document issues and concerns for this site as well as the need to respond in a timely fashion if problems are identified

Section 2.7.1

1. What site conditions were documented? Presumably, it was more than drawings and maps. The department believes that documents pertinent to baseline conditions include reports of residual contaminants, design considerations and specifications for engineered site features, as built documents, identification of significant departures from initial design and indication of any impact on expected performance. Also, where will this baseline information be maintained? As a minimum, one set should be maintained at the site and another at the local repository. Each repository should be inventoried periodically to insure their ordered availability.

Section 2.7.3

1. The department should be included in the initial GJO inspection of the site, presumably anticipated as the responsibility transitions from Oak Ridge to Grand Junction.

Section 2.7.5.

1. Although the Weldon Spring Feed Materials Plant processed various forms of ore and ore concentrates, it has generally never been casually referred to as “operation of the mills”. This sentence should be corrected or expanded to describe the full scope of the operations from a historical perspective. This appears to be a carry over from LTS plans developed for MILL sites in the west.

Section 2.8.1

1. Fencing. Does DOE plan to fence the leachate water treatment plant building?
2. Information signs. The plan should indicate that DOE will continue to list a toll-free number for DOE contact.

Section 2.8.2

1. Are the elevations of these markers known and recorded? Will these be used as part of the settlement evaluation inspection? If so, add to the inspection sheet.

Section 2.8.3

1. The relatively sparse monitoring networks make ongoing monitoring very important to prevent possible "surprises". Surface water should also be monitored into the future and should be represented here too.
2. References construction details and lithologic logs. Copies of these should be available at the site and the local repository.

Section 3.0

1. This section does not indicate how documents can be retrieved from the Interpretive Center. Will a copier be available? Can documents be borrowed or removed from the site? Who will check the documents in and out?

Section 3.1

1. Paragraph 1. Remediation has not yet been completed and will not be complete until all remedies, including institutional controls, are in place.

Section 3.1

1. Paragraph 1. Indicates the site will be inspected annually. Annual inspections are not adequate at the disposal cell. A minimum of semi-annual inspections of the disposal cell should be performed.
2. DOE must commit to CERCLA "periodic" reviews in perpetuity if waste remains on site.
3. DOE is responsible for ALL [delete - the regulated] radiological and other hazardous substances that remain at the Weldon Spring site.
4. Additionally, EPA, in consultation with the state of Missouri, MAY or is expected to [delete – will] concur in changes to the LTS Plan.

Section 3.2.1

1. General. There should be discussion of continuing site presence by DOE or a designee for preventative measures and detection of vandalism or other uncontrollable forces. While Section 3.3.1 does discuss this in general, it does not provide details of an on-site caretaker, or how DOE will provide for an on-site caretaker.
2. Paragraph 2. States that "differential settlement of the cell cover will be monitored through the use of terrestrial and/or aerial surveys, and rock gradation changes in the cell cover...will be visually assessed and evaluated" every five years. It is not clear how DOE will be able to identify if the soil cap beneath the rock cover settles and/or

ponds. It will be very difficult or nearly impossible to do this visually. DOE shall specify expected settlement and allowable tolerances in the inspection plan and identify how settlement of the soil cover will be monitored to compare actual settlement to expected values and ensure conformance with those tolerances. A similar comment would apply to the issue of visual evaluation of rock gradation.

Section 3.2.2

1. General. More definition as to how the physical inspection will be conducted is needed. Precise elevation surveys, aerial photography, GPS and other state-of-the-art measurement tools may be appropriate to evaluate cell performance and stability but this can not be determined from the information presented here. More details on the “how this will be done” is needed.
2. How will the inspectors determine all the aspects they claim to be able to inspect? Many of these will not appear obvious to an individual looking at the site once. A comprehensive set of detailed measurements and projections will be necessary to evaluate the integrity of the waste disposal cell. If a weed or tree appears, (which they will) will it be excavated to determine if the roots penetrated the cap?
3. A reasonably detailed inspection procedure for viewing the Southeast drainage does not exist. It should be well established that contamination remaining in the Southeast drainage is not considered static, DOE does not control the flow or erosion of the drainage course. As a result they do not presently control the contaminated sediments that were left in the drainage area. A comprehensive walkthrough and detailed radiological survey (hand held instruments 2x2 etc) of the drainage course appear appropriate at a minimum to determine if the contaminated areas remain stable. Although some cleanup was conducted previously, the remaining contamination can be easily eroded to the lower portion of the drainage where the public is likely to visit.
4. Paragraph 5. Last sentence. How will local citizens and responsible government entities have access to this information?

Section 3.2.3

1. Refers to the inspection checklist in Appendix D. After review of the inspection checklist, it appears there is no place in the checklist to outline if each area inspected is in satisfactory or unsatisfactory condition. Also, there are no timeframes on when an unsatisfactory condition will be remedied. DOE should revise the inspection checklist to include these features. As stated previously, inspections should be performed semi-annually. Appendix D refers to Table 3-7 as being the "Potential Disposal Cell Event Scenarios". The reference appears to be incorrect and should reference Table 3-6. Please revise.

Section 3.2.4

1. Paragraph 2. A biology, ecology, or range management background does not appear to be appropriate for a detailed inspection of compliance with engineered specifications. Please delete this reference. All inspections shall ultimately be certified by a professional engineer registered to practice in Missouri and Surveys shall be certified by a Missouri registered Land Surveyor.

Section 3.2.5

1. The department must be given the opportunity, as part of our role as independent oversight agency, to accompany DOE inspectors in performance of the semi annual and follow-up inspections.

Section 3.3.1

1. The LTSM Program **will** conduct follow-up inspections... (delete the word may). The word **may** appears twice in the second paragraph. These should be deleted.
2. Paragraph 4. Who and which office at DOE is to be notified? In that same sentence the word “even” should be “event”.

Section 3.3.2

1. Refer to comment under Section 3.2.4.

Section 3.3.3

1. A copy of the follow-up reports shall be provided to the department as they are completed. Waiting to provide these until the next annual report is issued is not appropriate.

Section 3.4

1. Paragraph 1. DOE incorrectly refers to a “5-year review.” CERCLA prescribes a periodic review whenever indicated but at intervals of no more than five years. The LTS plan should correct this language and make it clear that a “periodic review” will be conducted whenever conditions warrant.
2. Paragraph 2. Insert “EPA”- i.e. “DOE will consult current **EPA** guidance
3. Paragraph 3. States that the most recent Five-year review was completed in June 2001. The review report was not submitted to the department until early September 2001. The report was reviewed, relative to the criteria listed in corresponding EPA guidance, and found to be incomplete. Comments were provided to DOE in January 2001, and we are still hopefully awaiting a response some eight months later. DOE should conduct a proper and complete “periodic review” as soon as reasonably possible to overcome the deficiencies found in the June report. This would give all participants an indication of what might be encountered in future reviews and possibly assist in further development of the Stewardship Plan.

Section 3.5

1. General. Needed access easements must be enforceable and last as long as monitoring is required.
2. Paragraph 3. References an operation and maintenance plan for the leachate collection and removal system. Please see comments on sections 3.6.3 and Table 3.6 for the comments on proper operation of the leachate collection and removal system. Also, access easements should be obtained from the Missouri Department of Conservation for the road from Route D to the Leachate Collection Sump.

- 3 Paragraph 4. Consideration should be given to periodic monitoring for radon as well as methane.
- 4 Paragraph 6. What criteria will trigger “control” on the cell cover? If vegetation is not monitored and maintained outside the proposed 300-foot buffer zone what will prevent erosion from exposing subsurface zones of residual contamination that exceeds surface criteria?

Section 3.6.1.1

1. Paragraph 1. See comment from 2.4.4 above. Comparison of actual data to “baseline” values may provide little information.
2. Paragraph 2. It is not necessarily appropriate to conduct or initiate compliance monitoring when results from two consecutive detection periods (this could be inferred to be a period over two years) indicate a statistically significant increase in concentrations above baseline. Baseline groundwater conditions are contaminated and do not necessarily provide a fair assessment of performance of the waste disposal cell. Further consideration of this issue is needed.
3. Paragraph 3. This paragraph seems to negate the reason for detection monitoring. If DOE is aware of some other way to evaluate cell performance, then this should be specified in the plan. Otherwise, statistical increases in detection monitoring shall trigger compliance monitoring unless the department agrees that the cause is not related to cell performance.
4. Paragraph 4. References Appendix F for the groundwater-monitoring plan. This plan was not included in the report. The plan proposes to change from variance analysis to an intrawell comparison using the tolerance interval approach. While this may be appropriate, the department has had no indication that a change was proposed. More time, and a specific proposal and justification from DOE, is needed to evaluate this approach. The proposed alternative statistical procedure may be acceptable. The department previously requested that the entire cell ground water monitoring plan be revisited. Much information has been obtained since the plan was originally put in place, which should be considered and addressed.

Section 3.6.1.2

1. The objectives and general scope of the future monitoring plans referenced here should be established in this document if it is to be approved. A start in this direction is made regarding the quarry monitoring but not for the GWOU.

Section 3.6.1.3.

1. General. The remedy prescribes long-term monitoring to confirm that natural processes are effective in attenuating ground water contaminants before they reach

the St. Charles County Well field. The QROU ROD calls for the use of institutional controls to minimize exposure to residual contaminants.

2. DOE should monitor for any increase in contaminant concentrations in the surface water and sediments of the slough as well as the groundwater to the north and south.
3. DOE should take additional appropriate response actions if groundwater south of the slough shows an increasing trend; not waiting until they exceed a trigger level of 20 pCi/L in a known drinking water source.
4. Paragraph 2. DOE removed major sources of possible contamination but did not remove the entire source of residual contamination as residual contamination remains in fractures, soil, and suspended or dissolved in groundwater. Several hundreds of kilograms of uranium may remain and needs to be carefully monitored.
5. Paragraph 12. The proposed 20 pCi/l is an inappropriate trigger to use to indicate possible increase in uranium concentrations south of the slough as individual wells have shown inconsistent historic values. Reported results for individual wells should be evaluated by an appropriate statistical method to determine when an increasing trend is evidenced. In practice, this approach should result in detection of upward trends in uranium concentrations before the 20 pCi/l MCL level is exceeded.

Section 3.6.2.1

1. DOE considers spring water to be an expression of groundwater; however, it is listed as a surface water monitoring location and is clearly impacted rapidly and significantly by precipitation. Sampling Burgermeister Spring only during high flow as proposed is inappropriate. Sampling during high flow is expected to show more diluted concentrations now that soil remediation at the Chemical Plant is completed. Data presented in table 2-6 supports this understanding. Other potential surface water monitoring locations should be identified to further document the quantity of residual contaminants, which are possibly leaving the site as a result of periodic erosion. High flow conditions may be indicated for this purpose.
2. Monitoring efforts and contingency plans as described in the plan are too vague to be of any use.

Section 3.6.3

1. Paragraph 2. Indicates that leachate quantities will be confirmed using a manual gauge stick. DOE shall explain how this will be performed/calculated using a manual gauge stick.
2. Paragraph 3. States that DOE will monitor the flow rate at each of the two secondary liner conveyance pipes. This shall also be explained in more detail. Also, as previously noted, the “dry well” next to the sump is not dry. The reason for the

presence of liquid in a closed system, which should have been dewatered by now, must be addressed.

3. Paragraph 4. Indicates that leachate levels and flow rates will be monitored and recorded daily at the outset. As a reliable database is generated, DOE may modify the sump level monitoring frequency. At a minimum, the leachate shall be pumped and recorded to keep the sump from reaching maximum capacity. In accordance with 40 CFR 264.303(c), the leachate from the leak detection system sump shall be pumped and recorded at least monthly. If the liquid level in the sump stays below the pump operating level for two consecutive months, the amount of liquids in the sumps must be pumped and recorded at least quarterly. If the liquid level in the sump stays below the pump operating level for two consecutive quarters, the amount of liquids in the sump must be pumped and recorded at least semi-annually. The frequency will divert back to monthly if the levels increase. Since the leachate is pumped manually at DOE, the pump operating level for this site will be equal to the maximum amount of liquid in the sump as defined in 40 CFR 264.303(c)(3). This does not include the secondary containment of the sump or the storage capacity of the cell liner system. DOE shall revise this section to include this requirement. DOE shall also include the maximum capacity of the sump. (From page 2-19, it appears the capacity is 11,200 gallons).
4. Paragraph 6. In accordance with 10 CSR 25-7.264(2)(N)2.G., "the owner/operator shall analyze leachate from the leak detection system at least annually." "At the first occurrence of leachate in the leak detection system, the owner/operator shall analyze leachate from that system for the complete list of parameters identified in 40 CFR 264 Appendix IX." After the initial round of sampling, the leachate shall be analyzed for the constituents detected in the Appendix IX sampling and all other constituents known to be disposed of into the landfill. Minimally, the leachate in the leak detection system shall be analyzed annually. DOE shall revise the plan to include this requirement and how it will be performed.
5. Paragraph 7. Outlines contingency treatment for the leachate pumped from the sump. DOE shall obtain approval from the WPCP for this activity prior to operation. Also, DOE shall identify how the contingency wastewater treatment system will be fully assembled and in operation before leachate has backed up into the cell liner system. Operating specifications and manuals and inspection criteria for the system shall be included as a part of the Stewardship Plan.
6. Paragraph 9. DOE has previously agreed to an Action Leakage Rate of 100 gallons per acre per day.
7. This report barely mentions an ALR and does not include much response actions if the ALR is exceeded. In accordance with 40 CFR 264.304, there are requirements if the ALR is exceeded. Also, see 10 CSR 25-7.264(2)(N)2.I. for the state requirements if 10% of the ALR is exceeded. DOE shall revise the plan to include these requirements.

Section 3.6.4.

1. To assure the radon barrier remains protective, add a measurement and evaluation of radon release to the periodic CERCLA review.
2. DOE has not sufficiently justified not conducting air monitoring to determine if a release has occurred. A failure of the radon barrier and or release of radon would not necessarily be visible to the naked eye. It is also reasonable to expect the cell to function adequately upon completion, to verify continued proper performance of the radon barrier. It was inappropriate for DOE to cease radon monitoring in 2000 as the last waste was placed in the cell in 2001.

Section 3.7.

1. Monitoring of institutional controls not only implies that the sites be viewed to confirm that construction activities and use activities are consistent or less than anticipated (ie. the remedy is protective). Verification that the necessary legal instruments still exist and are accessible is a key component.

Section 3.12

1. As noted by the Stakeholders, Public Participation is sadly lacking and does not contain much, if any useful information. It is also recommended that they include any information that is mentioned in other documents and not just cite them. For example, in this section the reader is referred to the “Long-Term Surveillance and Maintenance Program Plan” (DOE 1999a). This information should be included in this section.

Section 3.13

1. Access and Retrieval, Paragraph 3. The word “may” is again used to describe what is being proposed to be available at the local site. The word “may” should be deleted and the word “shall” inserted.

Tables

Table 1-1

1. By including the DOE orders the narrative and chart imply they are enforceable. These are only enforceable within DOE as guidance and have not been promulgated. The report should make this clear.

Table 2-2

1. The Holocene is incorrectly listed in the column identified as “Series”. The Holocene is an *epoch* of the Pleistocene Series.

Table 2-3

1. Indicates that uranium, thorium, radium, nitroaromatic compounds, metals, asbestos, PAHs, and PCBs were placed into the disposal cell. Page 3-8, table 3-4, outlines the contaminants of concern for the groundwater detection monitoring program. Table 3-4 does not include PAHs or PCBs in the constituents to be monitored. In accordance with 40 CFR 264.93, a facility shall monitor for the constituents "that are reasonably expected to be in or derived from the waste contained in a regulated unit." The plan shall be revised to include all the constituents known to be in the waste disposed of into the cell.
2. This chart should include all vicinity properties, (ARMY, DOC, etc) that are not cleaned up to unrestricted future use standards.
3. The Katy Trail, owned by the department, requires institutional controls. Also, there was a culvert pipe under the WSOW access road that was grouted. This culvert would need to be managed in the future if it were ever removed.
4. Table 2-5, 2-6 & 2-7 could use some clarification. For the average person reading these tables it is not clear if these numbers should be of concern. The all important question asked by citizens is -“Is this safe?”- and should be answered to the best of DOE’s ability.

Table 2-12

1. Refer to the previous comment regarding institutional controls for the Katy Trail.

Table 3-1

1. Items such as “conduct regular inspections, monitor groundwater, monitor institutional controls” need definition of a time span or occurrence frequency. The wording as shown is too vague.

Table 3-4

1. Sampling frequency should be quarterly. Same comment to the paragraph following the noted table.
2. Monitoring is proposed to be semi-annual. The department advocates quarterly sampling for several years, until a base line post cell closure can be established. The monitoring parameters list does not include any of the recycled uranium constituents (i.e. Pu, Np, Tc-99). These constituents should be monitored at least annually.
3. The Disposal Cell analyte list should be more representative of the identified contaminants of concern as listed in the *Baseline Assessment for the Chemical Plant Area of the Weldon Spring Site, November 1992*

Table 3-5

1. Why are Tc-99, Np and Pu not included? While quarterly sampling for these constituents may not be needed, at least annual checks should be made. If detects are low to non-detect over a reasonable period, deletion of these constituents may be considered.
2. The Quarry analyte list should be more representative of the identified contaminants of concern as listed in the *Baseline Risk Assessment for the Quarry Residuals Operable Unit of the Weldon Spring Site, Weldon Spring, Missouri, April 1997*.

Table 3-6

1. Page 3-17, Potential Disposal Cell Event Scenarios, page 3-17, the settlement-induced cracking of the radon/infiltration barrier section does not clearly outline how this will be documented. As stated in comment 5, DOE shall further clarify how this settlement will be documented.
2. Why are Tc-99, Np and Pu not included? While quarterly sampling for these constituents may not be needed, at the least annual checks should be made. If detects are low to non-detect over a reasonable period, deletion of these constituents may be considered.
3. Page 3-17, Potential Disposal Cell Event Scenarios, page 3-18, the rock cover deterioration section outlines when the rock may be replaced. DOE shall explain in detail how the inspector will visualize the percentage of rock degradation. Also, the inspection checklist does not include a section for the inspector to document this yearly degradation.
4. Page 3-17, Potential Disposal Cell Event Scenarios, page 3-19, the abnormal functioning of the leachate collection and removal system outlines response actions for the leachate collection and removal system. DOE shall incorporate the state and

federal requirements for the Action Leakage Rate exceedances. The last sentence states, "If fluid accumulates in the sump secondary containment to the extent that trend analysis indicates that removal may be required within 12 months or if fluid levels rise and then begin to fall, DOE will determine the source of the fluid, the cause of the fluid level fluctuations, and necessary corrective action." If any fluid collects in the sump secondary containment, this liquid shall be removed as soon as practical and the source determined and repaired. This section shall be revised accordingly. Page 2-19, first and second paragraphs shall also be revised to include corrective action if the sump secondary containment acquires any fluids.

Figures

Figure 2-3 & Figure 2-4

1. An approximate mean sea level datum for the Missouri River could be shown on the cross-sections to assist in visualizing vertical change between the sites and possible discharge to Missouri River.

Figure 2-4

1. This figure incorrectly identifies the bedrock at the bottom of the quarry as Kimmswick Limestone. The bottom of the quarry extends down into the Decorah Group as stated in the text in paragraph one page 2-9. The figure should be revised. There is a typographical error in the spelling of “Fined-Grained Alluvium”. The word “Fined” should be spelled *Fine*.

Figure 2-9.

1. Scale is too small to be easily read on the document available from the internet posting. Ultimately, consideration should be given to larger drawings to convey information contained in this figure.
2. The map depicts the extent of uranium contamination but only that above the adopted Maximum Contaminant Level. It should be revised to show all areas of residual contamination above background. Similar drawings should be included for soils and sediments with residual contaminants at levels above background.

Figure 2-10.

1. Same comment referencing TCE as 2-9.

Figure 2-11

1. Same comment referencing Nitrate as 2-9.

Figure 2-12

1. Same comment referencing 2,3-DNT as 2-9.

Figure 2-16.

1. The location of the background surface water sampling location, SW-2007, shall be identified.

Figure 2-18.& Figure 2-19.

1. Indicate in the legend that there are survey monument and identifiers in the figures. These monuments could not be found on the figures. In addition, the legend indicates there is a note 1 and no notes could be found on the figure. Please explain.